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25 September 2006 Amendment
Responsive to 25 April 2006 Office Action

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Amendments to the Specification:

Please replace the paragraph on page 7, starting at line 16, with the following amended paragraph:

FIGs. A3A and 3B illustrate the principle of differential interference. One of the sheared beams is referred to as a beam 7a. This illuminating beam is a plane wave which has a phase of the same level, and according to the difference in level d of the surface of the wafer 1, the phase of the wavefront of the reflected light 7b varies by $2d$. Through the interference of this plane wave and another sheared plane wave, it is possible to detect an edge portion of a pattern brightly. Further, in order to detect the edge portion of the pattern in a brightened state and the flat portion in a darkened state, it is preferable that the beam of light entering the birefringent prism 200 is linearly polarized and the direction in which the incident polarized light vibrates forms an angle of 45° with respect to the direction of shearing. This is because it is desirable for the amplitudes of the two sheared beams to be almost the same.

Please replace the paragraph bridging pages 8 and 9, starting at line 23, with the following amended paragraph:

Further, the light reflected off the PBS 11 becomes a ring-shaped (zonal) hollow beam 8 after passing through a meniscus cone lens 40, and the diameter of the ring is adjusted by lenses 45 and 46 and aperture diaphragm 47 after being reflected by mirror 42. The s-polarized component of this light is reflected toward the wafer 1 by a PBS 50, and it is rotated and polarized as p-polarization with respect to the PBS 20 by the half-wavelength plate 53, which can be rotated by the rotary mechanism 53d. This light passes through the PBS 20, reaches the mirror 35

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by way of an annular path passing outside the objective lens 30, and it is reflected off the mirror 35 to become dark-field illumination light that illuminates the wafer 1 obliquely from outside of the objective lens 30. The amount of light of this dark-field illumination can be continuously controlled by adjusting the polarizing direction in which the light enters the PBS 20 by way of the half-wavelength plate 53.

Please replace the paragraph on page 11, starting at line 15, with the following amended paragraph:

In the configuration shown in FIG. 4, the transmitted light heads for the side of the bright-field illumination 7. Therefore, there is no light heading for the side of the dark-field illumination 8. When θ is increased, the light heading for the side of the bright-field illumination 7 propagates while following a cosine curve 5', and the light heading for the side of the dark-field illumination 8 propagates while following a sine curve 4', as seen in FIG. 7. Therefore, by adjusting θ , the distribution of the amount of the light heading for the side of the bright-field illumination 7 and the light heading for the side of the dark-field illumination 8 can be adjusted. Thus, the balance of illumination of the dark-field and the bright-field can be adjusted, which can achieve a highly sensitive inspection.

Please replace the paragraph on page 12, starting at line 6, with the following amended paragraph:

However, there is an electric insulating film (for example, SiO₂) formed on the wafer 1. This SiO₂ film is optically transparent. Therefore, it causes so-called thin film interference, which is interference between the light reflected off an upper surface of the film and the light reflected ~~off~~ off an under surface of the film.

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Therefore, when inconsistencies in film thickness exist in the SiO₂ films of the die 200a and the adjacent die 200b in FIG. 8A, a distribution of the thin film interference is caused, which is detected as a difference in brightness in the detected images. When the difference in film thickness of SiO₂ films does not affect a device critically, such inconsistencies in brightness should not be detected. Therefore, it is necessary to set a threshold value so as not to cause detection of such inconsistencies in brightness, making the threshold value high and the inspection sensitivity low.

Please replace the paragraph bridging pages 13 and 14, starting at line 23, with the following amended paragraph:

FIG. 9C shows the amount of light distribution of the dark-field detection in the A-A portion. In the dark-field detection, irregularities on the wafer 1 can be detected as a brightness. Therefore, it is possible to detect convex defects having a lower reflectance on the pattern having a low reflectance with a high signal level S210c. On the contrary, since the horizontal resolution of the dark-field illumination is optically low, the signal level ~~5240c~~S210c of massive defects becomes low. Thus, the method which is able to detect the defect 210 easily is the dark-field detection method, and the method which is able to detect the defect 212 easily is the bright-field detection method.

Please replace the paragraph on page 18, starting at line 6, with the following amended paragraph:

The direction in which the light reflected ~~off~~off the PBS 20 vibrates is shown in FIG. 15A. In the drawing, the light is linearly polarized light which vibrates in a direction parallel to the x axis. This linearly polarized light is allowed to enter a

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birefringent wavelength plate 216 whose thickness is modified to have a V-shape, as seen in FIG. 15B. The thickness of this birefringent wavelength plate is formed such that there is a difference in birefringent phase of $n\lambda + \lambda/2$ around the periphery; and, at the central portion, there is a difference in birefringent phase of $n\lambda$. The crystal axis of the wavelength plate is set at an angle of 45° with respect to the x axis. Thus, the direction of vibration of the light passing through the wavelength plate is rotated by 90° at both ends on the x axis with respect to the direction of the polarized light before entering the wavelength plate, as seen in FIG. 15C. Further, at positions other than the both ends, they turn to be elliptically polarized light.

Please replace the paragraph on page 19, starting at line 12, with the following amended paragraph:

FIG. 17 shows an optical system in which differential interference and elliptical polarization are combined. The linearly polarized light reflected off the PBS 20 enters a birefringent prism 200 and is sheared into two beams of light. The direction in which each polarized light vibrates is rotated by a half-wavelength plate 22 to become elliptically polarized light. The elliptically polarized light illuminating a wafer 1 through an objective lens 30 is regularly reflected off the wafer and is again captured by the objective lens 30. Due to a phase shift, the light regularly reflected ~~off~~ the wafer enters a quarter-wavelength plate 26 again. The light passing through the quarter-wavelength plate 26 becomes linearly polarized light again and enters the half-wavelength plate 22. Further, the two beams of light are turned to be coaxial relative to each other by the birefringent prism 200.